

# DARPA Accomplishments: Seminal Contributions to National Security

By making pivotal, early investments in technologies with the potential to create and prevent strategic surprise, DARPA has catalyzed a decades-long series of breakthroughs critical to military superiority and national security. The agency works in collaboration with partners in industry, academia, the military Services and other government agencies to bring its advances to fruition. DARPA's notable achievements include:

## Stealth Technology

Low observability, or stealth, is a highly valuable battlefield capability, but one that for decades was largely unavailable to aircraft. DARPA took on the extreme challenge of in-flight stealth, and made it a reality for U.S. combat aircraft. In doing so, the agency helped change the shape and prospects of wars in Iraq, Afghanistan, and Libya.

## Computing and Communications

DARPA research played a central role in launching the Information Revolution. The agency developed and furthered much of the conceptual basis for the ARPANET—the prototypical communications network launched by DARPA nearly half a century ago, which led directly to the now ubiquitous Internet. DARPA also provided many of the essential advances that made possible today's computers and communications systems, including seminal technological achievements that support the speech recognition, touch-screen displays, accelerometers, and wireless capabilities at the core of today's smartphones and tablets. DARPA has also long been a leader in the development of artificial intelligence, machine intelligence and semi-autonomous systems. DARPA's efforts in this domain have focused primarily on military operations, including command and control, but the commercial sector has adopted and expanded upon many of the agency's results to develop wide-spread applications in fields as diverse as manufacturing, entertainment and education.

## Microelectronics

DARPA's has repeatedly set and then achieved record-breaking goals in the field of microelectronics. The agency pioneered a number of novel digital and analog designs that are now integral to computing and communications and that point to future capabilities far beyond what is possible today. Many of these advances have had immediate applicability in military command and control operations as well as other national security domains. But they have also helped fuel the ongoing revolution in commercial electronics, stoking iterative technical improvements and enabling economies of scale that have, in turn, fed back to the military Services and other defense entities to benefit national security.

## Intelligence, Surveillance and Reconnaissance

DARPA has a long record of successfully envisioning, designing and introducing new technologies essential to advanced radar, data links, and electro-optical and infrared sensors—technologies that U.S. forces have relied upon from the 1990s to today to provide strategic awareness and battlefield dominance. In particular these improvements have supported game-changing abilities to detect, identify, and track foes in every domain—on land, on and under the seas, and in the sky—and to target weapons with unprecedented accuracy.

**DARPA's mission is to make the pivotal early technology investments that create or prevent strategic surprise for U.S. national security**

*Distribution Statement A - Approved for Public Release, Distribution Unlimited*

April 2014

DARPA



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## Position, Navigation and Timing

Revolutionary DARPA advances in electronics shrank global positioning system (GPS) receivers dramatically. As a result, these sophisticated devices can today be carried easily by troops to provide location information or integrated into weapons to inexpensively turn “dumb” bombs into precision-guided munitions. Enhanced and miniaturized GPS has significantly improved the U.S. military’s ability to attack and eliminate difficult targets, and to do so from greater distances—fundamentally and progressively changing strategy and enabling successes during the Cold War, the Gulf War, and in more recent conflicts in which the United States has had to contend with dispersed and elusive foes. Beyond military applications, GPS devices have now become ubiquitous in daily civilian life, providing enormous commercial and consumer value.

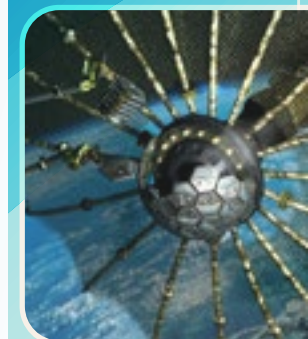
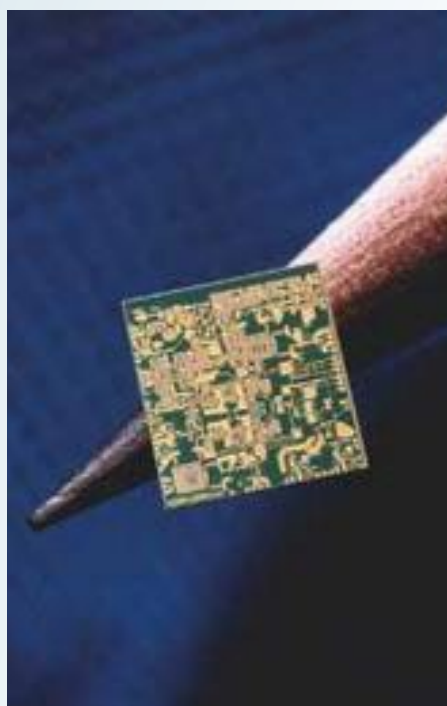
## Unmanned Aerial Vehicles

DARPA has advanced unmanned aerial vehicle (UAV) technologies and capabilities significantly since the agency made its initial investments in the field decades ago, delivering major impacts in recent years in Afghanistan,

Iraq, and Pakistan. DARPA’s contributions over this period have included research efforts relating to structures, propulsion, guidance, payload sensors and communications, and have led to important advances in the integration of surveillance and strike capabilities.

## Infrared Night Imaging

DARPA developed and continues to invest in enabling technologies that improve our air and ground forces’ and weapons’ capabilities to “see” in the dark with higher sensitivities and at longer standoff distances—granting U.S. warfighters the crucial tactical ability to “own the night.” Among the developments pioneered by DARPA were critical reductions in pixel size and, consequently, in device size and weight. DARPA’s investment have also played a key role in making thermal imaging more affordable and more flexibly integrated into a variety of battlefield platforms.



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